Theory of Equations

6

1m	2m	3m	4m	5m	6m	Total
1	1	1	–	1	–	11
1(K)	2(S)	1(U)	–	1(A)	–	13

OR

1 MARK QUESTIONS

1. Solve for x: $x + a(x + b) = ax + b$. **(Knowledge)**
2. Solve for x: $7x - 5[x - \{7 - 6(x - 3)\}] = 3x + 1$.
3. Form the quadratic equation whose roots are 1, 2.
4. Form cubic equation whose roots are –1, 4, 6.
5. Find the nature of the roots of $6x^2 - 5x + 2 = 0$.
6. Solve: $b(b + x) = a^2 - ax$.
7. Solve: $\frac{x}{2} + \frac{2x}{3} = \frac{7}{2}$.
8. Solve: $2(7 + x) - 10 = 16 - 2(x - 24)$.
9. Solve: $3(x - 2) - (x - 1) = 7(x - 1) - 6(x - 2)$.
10. Solve: $3(x + 5) - 25 = 9 + 2(x - 7)$.
11. Find the nature of the roots of $2x^2 + 8x + 9 = 0$ without solving.

2 MARKS QUESTIONS

1. Solve: $x + \frac{3x-5}{4} = 2 + \frac{6x-8}{5}$. **(Skill)**
2. Solve the equations $x + 2y = 1$ and $3x - 2y = 5$ by elimination method.
3. Solve by formula method: $x^2 - 4x + 3 = 0$.
4. Solve by factorization method: $x^2 - 3x - 10 = 0$.
5. Solve the simultaneous equations $10x - 9y = 12$ and $3x - 9y = 17$ by substitution method.
6. Solve simultaneous equations $2x + y = 14$ and $3y = 33 + x$ by rule of cross multiplication.
7. Solve $x + 2y = 7$ and $2x - y = 4$ by comparision method.
8. The sum of 6 times a number and 5 times the number is 55. Which is that number?
9. Find two numbers whose sum is 64 and difference is 16.
10. The sum of two consecutive numbers is 23, find them.
11. Solve $2x(4x - 1) = 15$ by formula method.

3 MARKS QUESTIONS

1. The sum of three consecutive numbers is 186. Find them. **(Understanding)**
2. Divide 25 into two parts that the sum of the reciprocals is $\frac{1}{6}$.
3. Two numbers are in the ratio 7:5 and their difference is 12. Find the numbers.
4. If $\propto$ and β are the roots of the equation $2x^2 + 5x + 5 = 0$ then find the values of

   (i) $\frac{1}{\alpha}+\frac{1}{\beta}$ (ii) $\frac{1}{\alpha^2}+\frac{1}{\beta^2}$ (iii) $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$
5. If α and β are the roots of the equation $2x^2 - 10x + 5 = 0$. Find the value of

   $$\left(\frac{\alpha}{\beta^2}+\frac{\beta}{\alpha^2}\right)+2\left(\frac{\beta}{\alpha}+\frac{\alpha}{\beta}\right)-12\alpha\beta.$$
6. If α and β are the roots of the equation $3x^3 - 6x + 4 = 0$. Find the values of the following

   (a) $\alpha^2 + \beta^2$ (b) $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$
7. Find the quotient and the remainder obtained by dividing $3x^2 - 4x^2 + 2x + 1$ by $x - 3$.
8. Find an integral root between -3 and 3 by inspection and then using synthetic division find the quotient of $x^3 + 2x^2 - 11x - 12$ and also the remainder.
9. Find the quotient and remainder obtained by dividing $4x^3 + 3x^2 - 2x - 1$ by $(x + 1)$.
10. Find the quotient and remainder when $x^4 + 10x^3 + 39x^2 + 76x + 65$ is divided by $x + 4$.
11. Nine tables and eight chairs cost ₹456/-. Eight tables and nine chairs cost ₹462/-. Determine the cost of each table and of each chair.
12. Two sisters have their annual income as 5:8, while their annual expenditures are in the ratio 3:5, if they save ₹1000 and ₹1200 per annum respectively. Find their incomes.
13. Divide ₹110 into two parts so that 5 times of one part together with 6 times of the other part will be equal to ₹610.

5 MARKS QUESTIONS

(Application)

1. A number consists of two digits and whose sum is 3, if 9 is added to the number the digits get interchanged. Find the numbers.

2. Two brothers have their annual income as 8:5, while their annual expenditures are in the ratio 5:3 if they save ₹1200/- and ₹1000/- per annum. Find their incomes.
3. Three years ago father was 4 times as old as his son and after 5 years he will be three times as old as his son. Find their present ages.
4. A sum of two numbers is 21. If the larger is divided by the smaller, the quotient is 2 and the remainder is 3. Find the numbers.
5. Find an integral root between –3 and 3 by inspection and then using synthetic division. Solve the equation $x^3 - 2x^2 - 5x + 6 = 0$.
6. A certain two digit number is 4 times the sum of the digits. If 18 is added to the number, the digits get interchanged. Find the number.

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